

CLAIMS

What is claimed is:

1. A filtration barrier support comprising:

a rear strut, the rear strut having a rear strut upper end and a rear strut lower end, the rear strut lower end adapted for attachment to a ground surface;

an articulated front support, the front support comprising an upper front strut and a lower front strut, the upper front strut having an upper front strut upper end and an upper front strut lower end, the lower front strut having a lower front strut upper end and a lower front strut lower end, wherein the upper front strut upper end is flexibly attached to the rear strut upper end, wherein the upper front strut lower end is flexibly attached to the lower front strut upper end, and wherein the lower front strut lower end is adapted for attachment to a ground surface, and

wherein the articulated front support is adapted for attachment to a sheet, the sheet adapted for filtration of waterborne sediment.

2. The filtration barrier support of Claim 1, wherein the upper front strut upper end is pivotally attached to the rear strut upper end, and wherein the upper front strut lower end is pivotally attached to the lower front strut upper end.

3. The filtration barrier support of Claim 1, the articulated front support further comprising:

a temporary reinforcing assembly, the temporary reinforcing assembly removably attached to the upper front strut lower end and to the lower front strut upper end, and

wherein the temporary reinforcing assembly is so affixed as to maintain linear alignment of the lower front strut and the upper front strut during installation of the lower front strut lower end into the ground surface.

4. The filtration barrier support of Claim 1 further comprising:

at least one transverse strut, the transverse strut having a transverse strut front end and transverse strut rear end, the transverse strut rear end attachable to the rear strut, the transverse strut front end attachable to the articulated front support.

5. The filtration barrier support of Claim 1 wherein

the lower front strut is further adapted for installation at an interval point along a spanning path across a ground surface, the spanning path dividing the ground surface into an upstream area and a downstream area, the lower front strut, when so installed, extending away from the upstream area so as to form a first tilt angle and the upper front strut further extending away from the upstream area so as to form a second tilt angle, and wherein the rear strut is further adapted for installation to the ground surface at a point in the downstream area and, when so installed, extending toward the upstream area, and

wherein the first tilt angle is steeper than the second tilt angle.

6. The filtration barrier support of Claim 5, the first tilt angle comprising a tilt angle of between 0 degrees and 45 degrees and the second tilt angle comprising a tilt angle of between 15 degrees and 65 degrees.

7. The filtration barrier support of Claim 6, wherein
the sheet is further adapted for attachment to at least one additional filtration barrier support, each of the additional filtration barrier supports equivalent in structure to the filtration barrier support, and each at least one additional filtration barrier support adapted for installation at an interval point along the spanning path, and

wherein when the filtration barrier support and additional filtration barrier supports are installed at interval points along a spanning path and the sheet is attached to the filtration barrier support and additional filtration barrier supports, the sheet forms a filtration barrier having a lower filtration barrier section sloped at the first tilt angle and an upper filtration barrier section sloped at the second tilt angle.

8. The filtration barrier support of Claim 1, the sheet comprising a geo-fabric sheet.

9. The filtration barrier support of Claim 6, the geo-fabric comprising a geo-textile sheet.

10. A filtration barrier support, the filtration barrier support comprising:
an articulated front support, the articulated front support comprising a plurality of front struts, the plurality of front struts assembled in an articulated,

linear configuration, wherein each front strut is disposed adjacent to at least one other front strut, and wherein each the front strut is flexibly attached to each the adjacent front strut, the plurality of struts comprising:

a lower front strut, the lower front strut having a lower front strut lower end, wherein the lower front strut lower end is adapted for attachment to a ground surface; and

at least one intermediate front strut; and

at least one rear strut, each the at least one rear strut having an rear strut a rear strut lower end, each the rear strut lower end adapted for attachment to a ground surface, wherein each the at least one rear strut is flexibly attached to a front strut,

wherein the articulated front support is adapted to receive a sheet, the sheet adapted for filtration of waterborne sediment.

11. The filtration barrier support of Claim 10 wherein

the lower front strut is further adapted for installation at an interval point along a spanning path across a ground surface, the spanning path dividing the ground surface into an upstream area and a downstream area, the lower front strut, when so installed, extending away from the upstream area so as to form a first tilt angle and each the intermediate front strut sequentially further extending away from the upstream area so as to form a plurality of intermediate tilt angles, and wherein for each at least one rear strut, the rear strut is further adapted for

installation to the ground surface at a point in the downstream area and, when so installed, extending toward the upstream area, and

wherein the lower tilt angle is steeper than each the intermediate tilt angles, and each the intermediate tilt angle is steeper than each subsequent intermediate tilt angle.

12. The filtration barrier support of Claim 14, the lower tilt angle comprising a tilt angle of between 0 degrees and 45 degrees, and each the intermediate tilt angle comprising a tilt angle of between 5 degrees and 90 degrees.

13. A silt fence, the silt fence comprising:

a support assembly; and

a geo-textile sheet, the geo-textile sheet disposed upon the support assembly so as to form a filtration barrier having a falling, non-negative compound slope.

14. A filtration barrier comprising:

a plurality of filtration barrier supports, each the filtration barrier supports comprising

a rear strut, the rear strut having a rear strut upper end and a rear strut lower end, the rear strut lower end adapted for attachment to a ground surface; and

an articulated front support, the front support comprising an upper front strut and a lower front strut, the upper front strut having an upper front strut upper end and an upper front strut lower end, the lower front strut having a lower front strut upper end and a lower front strut lower end, wherein the upper front

strut upper end is flexibly attached to the rear strut upper end, wherein the upper front strut lower end is flexibly attached to the lower front strut upper end, and wherein the lower front strut lower end is adapted for attachment to a ground surface; and

a sheet, the sheet adapted for filtration of waterborne sediment, wherein the sheet is attached to the plurality of filtration barrier supports, each OF the articulated front supports of each the filtration barrier support attached to the sheet at intervals along the sheet.

15. The filtration barrier of Claim 14, wherein for each the filtration barrier supports, the upper front strut upper end is pivotally attached to the rear strut upper end, and wherein the upper front strut lower end is pivotally attached to the lower front strut upper end.

16. The filtration barrier of Claim 14, wherein for each filtration barrier support, the lower front strut is further adapted for installation at an interval point along a spanning path across a ground surface, the spanning path dividing the ground surface into an upstream area and a downstream area, the lower front strut, when so installed, extending away from the upstream area so as to form a first tilt angle and the upper front strut further extending away from the upstream area so as to form a second tilt angle, and wherein the rear strut is further adapted for installation to the ground surface at a point in the downstream area and, when so installed, extending toward the upstream area, and

wherein the first tilt angle is steeper than the second tilt angle.

17. The filtration barrier of Claim 15, wherein for each filtration barrier support, the first tilt angle comprising a tilt angle of between 0 degrees and 45 degrees, and the second tilt angle comprising a tilt angle of between 15 degrees and 65 degrees.

18. The filtration barrier of Claim 16, wherein for each filtration barrier support, the first tilt angle is substantially equivalent to the first tilt angles of the plurality of filtration barrier supports, and wherein for each filtration barrier support, the second tilt angle is substantially equivalent to the second tilt angles of the plurality of filtration barrier supports.

19. The filtration barrier of Claim 17, wherein when the plurality of filtration barrier supports are installed at interval points along the spanning path, the sheet, at each the barrier support, forms a filtration barrier having a lower filtration barrier section sloped at the first tilt angle and an upper filtration barrier section sloped at the second tilt angle.

20. The filtration barrier support of Claim 14, the sheet comprising a geo-fabric sheet.

21. The filtration barrier of Claim 19, the geo-fabric sheet further comprising a geo-textile.

22. The filtration barrier of Claim 20, the geo-textile further comprising a woven geo-textile.

23. The filtration barrier of Claim 18, the sheet further comprising a ground skirt, the ground skirt attached to the lower filtration barrier section.

24. The filtration barrier of Claim 22, the ground skirt further comprising a geo-fabric sheet.

25. A filtration barrier comprising:

a plurality of support frames, each the support frame adapted for installation upon a ground surface at interval points along a spanning path, the spanning path being transverse to gravity-directed water flow, and the spanning path defining an upstream ground surface area and a downstream ground surface area; and

a geo-textile sheet, the geo-textile sheet affixed to each the support frame,

wherein when the plurality of support frames is installed at interval points along the spanning path, the geo-textile sheet forms a filtration barrier surface extending along the spanning path such that the filtration barrier surface impedes the water flow, the filtration barrier surface comprising an upper filtration barrier surface and a lower filtration barrier surface such that

the lower filtration barrier surface and the upper filtration barrier surface extends adjacently along the spanning path, the lower filtration surface proximal to the ground surface and the upper filtration barrier surface distal to the ground surface,

the lower filtration barrier surface extends over the downstream ground surface area at a first slope angle, the first slope angle orthogonal to the spanning path,

the upper filtration barrier surface further extends over the downstream ground surface area at a second slope angle, and

the first slope angle is steeper than the second slope angle.

26. The filtration barrier of Claim 24, the first slope angle comprising a slope angle of between 0 degrees and 45 degrees, and the second slope angle comprising a slope angle of between 15 degrees and 65 degrees.

27. The filtration barrier of Claim 24, the first slope angle varying between 0 degrees and 45 degrees at different points along the spanning path, and the second slope angle varying between 15 degrees and 65 degrees at different points along the spanning path.

28. A filtration barrier comprising:

a plurality of support frames, each of the support frames adapted for installation upon a ground surface at interval points along a spanning path, the spanning path being transverse to gravity-directed water flow, and the spanning path defining an upstream ground surface area and a downstream ground surface area; and

a geo-textile sheet, the geo-textile sheet affixed to at least two the support frames,

wherein when the plurality of support frames is installed at interval points along the spanning path, the geo-textile sheet forms a filtration barrier surface extending along the spanning path such that the filtration barrier surface impedes the water flow, the filtration barrier surface comprising an upper filtration barrier

surface and further comprising at least one intermediate filtration barrier surface such that:

the lower filtration barrier surface extends along the spanning path, the lower filtration surface proximal to the ground surface,

the at least one intermediate filtration barrier surface extends along the spanning path in a sequential, articulated panel configuration, each intermediate filtration barrier surface more distal to the ground surface than sequentially previous intermediate filtration barrier surfaces,

the lower filtration barrier surface extends over the downstream ground surface area at a first slope angle, the first slope angle orthogonal to the spanning path,

the intermediate filtration barrier surface sequentially further extends over the downstream ground surface area so as to form a plurality of intermediate slope angles, and

the first slope angle is steeper than each the intermediate slope angles, and

the intermediate slope angle is steeper than each subsequent intermediate slope angle.

29. The filtration barrier of Claim 27, the lower slope angle comprising a slope angle of between 0 degrees and 45 degrees, and each the intermediate slope angle comprising a slope angle of between 5 degrees and 90 degrees.

30. The filtration barrier of Claim 27, the first slope angle varying between 0 degrees and 45 degrees at different points along the spanning path, and each the

intermediate slope angle varying between 15 degrees and 65 degrees at different points along the spanning path.

31. A filtration barrier assembly comprising:

a support assembly installed upon a ground surface along a spanning path, the spanning path being transverse to gravity-directed water flow, and the spanning path defining an upstream ground surface area and a downstream ground surface area; and

a geo-textile sheet attached to the support assembly so as to form a filtration barrier surface for impeding the water flow, the filtration barrier surface adapted to filter non-colloidal silt from the water flow, the geo-fabric sheet having a nominal water flow capacity proportional to the height of an intercepted water flow,

the filtration barrier surface comprising an lower filtration barrier surface, the lower filtration barrier surface extending from the ground surface upwards above the downstream ground surface area at a first slope angle, and the filtration barrier surface further comprising an upper filtration barrier surface, the upper filtration barrier surface extending from the lower filtration barrier surface further upwards above the downstream ground surface area at a second slope angle,

wherein the first slope angle is steeper than the second slope angle,

wherein when the filtration barrier surface intercepts a water flow of sufficient height that the lower filtration barrier surface and at least a portion of the upper filtration barrier surface are submerged beneath the surface of the water flow, the first slope angle is sufficiently steep so as to cause a portion of the non-

colloidal silt filtered by the lower filtration barrier surface to fall away from the lower filtration barrier surface, and the second slope angle is sufficiently shallow so as to expose the intercepted water flow to a sufficiently greater area of the filtration barrier surface so as to increase the water flow capacity of the geo-textile sheet as proportional to the height of the intercepted water flow.

32. The filtration barrier of Claim 30, wherein when the filtration barrier surface intercepts a water flow of sufficient height that the lower filtration barrier surface and at least a portion of the upper filtration barrier surface are submerged beneath the surface of the water flow, the second slope angle is sufficiently steep so as to cause a portion of the non-colloidal silt filtered by the upper filtration barrier surface to fall away from the upper filtration barrier surface

33. The filtration barrier of Claim 30, the geo-textile further comprising a woven geo-textile.

34. The filtration barrier of Claim 30, the first slope angle comprising a slope angle of between 0 degrees and 45 degrees, and the second slope angle comprising a slope angle of between 15 degrees and 65 degrees.

35. The filtration barrier of Claim 30, the first slope angle varying between 0 degrees and 45 degrees at different points along the spanning path, and the second slope angle varying between 15 degrees and 65 degrees at different points along the spanning path.

36. A filtration barrier, the filtration barrier comprising:

a support assembly, the support assembly adapted for extendable installation upon a ground surface along a spanning path, the spanning path being transverse to gravity-directed water flow, and the spanning path defining an upstream ground surface area and a downstream ground surface area; and

a geo-textile sheet, the geo-textile sheet attached to the support assembly,

wherein when the support assembly is installed along the spanning path, the geo-textile sheet forms a filtration barrier surface extending along the spanning path and impeding the water flow,

wherein when the support assembly is installed along the spanning path, the support assembly extends over the downstream ground surface area such that a portion of the filtration barrier surface forms an upwardly convex barrier surface relative to the upstream ground surface area.

37. The filtration barrier of Claim 35, the upwardly convex barrier surface having continuously varying tangential slope angles, the varying tangential slope angles steepest at such points of the curved surface most proximate to the spanning path, the varying tangential slope angles comprising slope angles of between 0 degrees and 90 degrees.

38. The filtration barrier of Claim 35, the geo-textile sheet having a nominal water flow capacity proportional to the height of an intercepted water flow, the upwardly convex barrier curved so as to maximize the water flow capacity of the geo-textile sheet as proportional to the height of the intercepted water flow.

39. A filtration barrier assembly comprising:

at least two support assemblies adapted for installation, each at interval points, along a spanning path across a ground surface, the spanning path dividing the ground surface into an upstream area and a downstream area, each the support assembly comprising

a rear strut, the rear strut having a rear strut upper end and a rear strut lower end, the rear strut lower end adapted for attachment to a ground surface; and

an articulated front support, the front support comprising an upper front strut and a lower front strut, the upper front strut having an upper front strut upper end and an upper front strut lower end, the lower front strut having a lower front strut upper end and a lower front strut lower end, wherein the upper front strut upper end is hingedly attached to the rear strut upper end, wherein the upper front strut lower end is hingedly attached to the lower front strut upper end, and wherein the lower front strut lower end is adapted for attachment to a ground surface; and

a woven geo-textile sheet, the woven geo-textile sheet adapted for filtration of waterborne sediment, the woven geo-textile sheet attached to a plurality of the articulated front supports, the woven geo-textile sheet further comprising a ground skirt, the ground skirt attached to the lower filtration barrier section,

wherein each support assembly may be installed at an interval point along the spanning path such that:

the lower front strut is attached to the ground surface at the interval point such that the lower front strut extends away from the upstream area so as to form a first tilt angle, the first tilt angle comprising a tilt angle of between 90 degrees and 45 degrees,

the upper front strut further extends away from the upstream area so as to form a second tilt angle, the second tilt angle comprising a tilt angle of between 75 degrees and 25 degrees

the first tilt angle is steeper than the second tilt angle, and

the rear struts is attached to the ground surface at a point in the downstream area and extended toward the upstream area so as to provide bracing support to the articulated front support, and

wherein the geo-textile sheet is attached to the articulated front supports so as to form a filtration barrier having a lower filtration barrier section sloped at the first tilt angle and an upper filtration barrier section sloped at the second tilt angle.